



Geology, Geochemistry, and Geophysics of Sedimentary- Hosted Au Deposits in P.R. China

Stephen G. Peters, editor

**Open-File Report: 02–131
Version 1.0**

2002

This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards or with the North American Stratigraphic Code. Any use of trade, product, or firm names is for descriptive purposes only and does not imply endorsement by the U.S. Government.

**U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY**

U.S. Geological Survey, Reno Field Office, Mackay School of Mines, MS-176, University of Nevada, Reno, Nevada 89557, speters@usgs.gov

GEOLOGY, GEOCHEMISTRY, and GEOPHYSICS of SEDIMENTARY ROCK-HOSTED Au DEPOSITS in P.R. CHINA

Stephen G. Peters (editor)

Summary

This report is the second report concerning results of a joint project and Annex Agreement between the U.S. Geological Survey and the Tianjin Geological Academy to study sedimentary rock-hosted Au deposits in P.R. China and in Nevada, USA. The Project has involved three joint field visits to deposits in China in 1997, 1999, and 2000 to 18 Chinese deposits and one visit to Nevada in 1999. Sedimentary rock-hosted Au deposits in China are important, because a number of deposits, such as the Lannigou Au deposit in the Dian-Qian-Gui area, contains >100 tonne Au resources. Many of the deposits are of medium size ~50 tonne Au resources and most have extensive exploration potential. In the Middle-Lower Yangtze River area, there are over 250 gossan Au occurrences in oxidation zones above sulfide-deposits. Since the 1980s, Chinese geologists have devoted a large-scale exploration and research effort to the deposits. As a result, there are more than 20 million oz of proven Au reserves in sedimentary rock-hosted Au deposits in P.R. China. Additional estimated and inferred resources are present in over 160 deposits and occurrences, which are under-going exploration. This makes China second to Nevada in contained ounces of Au in Carlin-type deposits. It is likely that many of the Carlin-type Au ore districts in China, when fully developed, could have resource potential comparable to the multi 1000 tonne Au resources in northern Nevada.

The six chapters of this report describe sedimentary rock-hosted Au deposits that were visited and also provide descriptions that were compiled from the literature in China in three main areas: the Dian-Qian-Gui, the Qinling fold belt, and Middle-Lower Yangtze River areas. Two introductory chapters provide an over view of sedimentary rock-hosted Au deposits and Carlin-type Au deposits and also provide a working classification for the sedimentary rock-hosted Au deposits. A final chapter contains a weights-of-evidence, GIS-based mineral assessment of sedimentary rock-hosted Au deposits in the Qinling fold belt and Dian-Qian-Gui areas. Appendices contain scanned aeromagnetic (Appendix I) and gravity (Appendix II) geophysical maps of south and central China. Data tables of the deposits (Appendix III) also are available elsewhere as an interactive database at <http://geopubs.wr.usgs.gov/open-file/of98-466/>. Geochemical analysis of ore samples from the deposits visited are contained in Appendix IV.

Chapters 1 and 2 provide a classification and summary of Chinese sedimentary rock-hosted Au deposits that mainly are located along the margins of the Precambrian Yangtze craton in the Qinling fold belt area in the north and northwest, the Dian-Qian-Gui area in the southwest, and the Middle-Lower Yangtze River area in the east. Distribution of the deposits is controlled by regional-scale rifts, district-scale short-axial anticlines (domes), deposit-scale high-angle

faults, stratabound breccia bodies, and unconformity surfaces. The deposits are hosted in Paleozoic to lower Mesozoic sedimentary rocks composed mainly of impure limestone, siltstone, and argillite. Alteration types mainly are silicification, decalcification, argillization, and carbonization. Igneous rocks usually are not present near most Chinese deposits. However, the Middle-Lower Yangtze River area contains pluton-related polymetallic replacement Au deposits.

Main types of sedimentary rock-hosted deposits in China are Carlin-type, pluton-related, syndeformational, unconformity-hosted, and red earth and laterite Au deposits. Gold is present as disseminations in most deposits, although local massive accumulations of Au-bearing sulfide are present, especially in mantos in the Middle-Lower Yangtze River area. The main opaque ore-bearing minerals include Au, electrum, pyrite, arsenopyrite, stibnite, orpiment, realgar, and cinnabar. Gangue minerals are quartz, barite, organic carbon, carbonate and clay minerals, and local albite. Geochemical elements associated with Au in Nevada deposits, such as As, Sb, Tl, and Hg, also are closely associated with many Chinese deposits, but U, Sr, W, and some PGE elements also are associated with some Chinese Au deposits. Stable isotopic data from deposits in China and Nevada suggest possible multiple fluid sources as indicated by interpretation of δD vs. $\delta^{18}O$, $\delta^{13}C$ vs. $\delta^{18}O$ and $\delta^{34}S$ data plots.

Chapter 3 describes deposits in the Dian-Qian-Gui area in southwest China associated with deposits of coal, Sb, Barite, and Hg. Most of the Au deposits are stratabound or structurally controlled, disseminated deposits commonly associated with structural domes. Deposits described are the Zimudang, Lannigou, Banqi, Yata, Getang, Sixianchang (Au-Hg), Jinya, Gaolong, Gedang, Jinba, and Hengxian Au deposits. Typical deposit characteristics include impure calcareous and carbonaceous host rock that contains disseminated pyrite, marcasite, and arsenopyrite with micron-sized Au in As-rich pyrite and realgar, orpiment, stibnite, and Hg-minerals, as well as minor base-metal sulfide minerals and elevated concentrations of As, Sb, Hg, Tl, and Ba. General lack of igneous rocks in the Dian-Qian-Gui area implies non pluton-related ore forming processes related to metal sources in carbonaceous parts of the sedimentary pile. Genetic processes that formed and mobilized petroleum and Hg may also be related to As-, Au-, and Tl-bearing coal horizons. Other Au deposits contain textures and features that indicate a strong structural control by tectonic domes or shear zones and suggest local syndeformational ore deposition possibly related to the Youjiang fault system. Several sedimentary rock-hosted Au deposits in the Dian-Qian-Gui area also are of the red earth-type (laterite-hosted) and have been concentrated and enhanced by the processes of deep weathering.

Chapter 4 describes Au deposits in the Qinling fold belt in central China, which is a long-lived mobile belt between the Huabei (North China) and Yangtze Precambrian cratons. The Qinling fold belt contains several groups of stratabound and tectonized sedimentary rock-hosted Au deposits in deformed or folded late Paleozoic to early Mesozoic sedimentary and volcanoclastic rocks in an east-west-elongated area approximately 750 km long and about 200 km wide. Deposits described in the East Qinling fold belt along the Ding-Ma Au belt are the Jinlongshan (Zhenan) Au deposit, as well as syndeformational Au deposits at Maanqiao, Baguamiao, and Shuangwang. Deposits in the West Qinling fold belt, associated with the Snow Mountain fault, also are described at Songpangou, Qiaoqiaoshang, and Dongbeizhai. Other deposits are described at Liba, Yinchanggou, Lianhechun, Laerma (Au-U), Manaoke (Au-W), and along the Luhuo-Daofu fault zone at Pulongba and Qiuluo. Sedimentary lithofacies in the Qinling fold belt contain low metamorphic grade calcareous sandstone, chert, siltstone, interbedded micritic limestone, carbonaceous and calcareous slate, and local mafic units.

Magmatic activity was widespread in the Qinling fold belt area and resulted in the emplacement of Paleozoic and Mesozoic geochemically intermediate composition stocks and plutons. Igneous rocks are not specifically exposed in or associated with most of the sedimentary rock-hosted Au deposits, although the Liba deposit has many pluton-related geochemical characteristics. Some minerals not normally common to Carlin-type sedimentary rock-hosted gold deposits locally are present in some deposits in the Qinling fold belt, such as scheelite, uranium, and titanium minerals, as well as local albite.

Chapter 5 describes various Au deposits in the Middle-Lower Yangtze River area that contains several hundred sedimentary rock-hosted Cu, Fe, Au, S and polymetallic deposits and is part of one of the most important metallogenic belts in China. Early Paleozoic to early Mesozoic sedimentary rocks contain host horizons for Cu, Au, and polymetallic deposits, as well as Carlin-type, distal-disseminated sedimentary rock-hosted Au deposits, and red earth or laterite-hosted Au deposits. Gold porphyry deposits are also locally present. Stratabound replacement Au deposits are hosted in specific horizons in Triassic sedimentary rocks in southeastern Hubei Province in Tonglushan-Daye area, and in Upper Carboniferous silty limestone horizons in Anhui Province in the Tongling area. Local Carlin-type deposits in the Middle-Lower Yangtze River area, such as the Zhanghai Au deposit, are hosted in black Silurian phyllite and shale. The Au deposits are associated with 160 to 180 Ma diorites in the Tonglushan (Daye) area and 140 to 150 Ma porphyry plutons in the Jinhangshan-Fengshandong-Lijiawan area and 80 Ma stocks at the Jinjinzui porphyry Au deposit in southeast Hubei Province. In Anhui Province, most stratabound ores, such as at Tongguanshan, Xinqiao, Mashan, and Huangshilaoshan are associated with 137 to 153 Ma stocks. Red earth, or laterite-hosted deposits, are represented by the Shewushan Au deposit and are a product of supergene redistribution of Au.

Chapter 6 uses the weights-of-evidence method of mineral assessment to investigate the potential areas of undiscovered sedimentary rock-hosted Au deposits and occurrences in the Qinling and Dian-Qian-Gui areas of the P.R. of China. Preliminary modeling was performed based on Bayesian probability, to produce resource favorability maps from various geoscientific data, primarily geology and structure. Maps of favorability reveal numerous regional-scale exploration targets in the two regional-scale study areas where few, if any, known sedimentary rock-hosted Au deposits or occurrences exist. Modeling also indicates that the most important criterion for predicting sedimentary rock-hosted Au deposits and occurrences in both the Qinling and Dian-Qian-Gui areas, in order of importance, are geologic units, geologic unit-related factors (proximity to unit boundaries and lithodiversity), and structure-related factors (proximity to faults and topographic slope).

中国沉积岩金矿床地质、地球化学和地球物理

(总 结)

史蒂芬 G.彼得斯

黄佳展

本文是美国地质调查所与中国天津地质研究院合作研究中国和美国（内华达）沉积岩金矿床项目的第二份报告。该项目包括中美双方于 1997 年，1999 年和 2000 年对中国沉积岩金矿床进行的野外调查，1999 年内华达沉积岩金矿床进行的野外调查，本报告 6 章中论述的滇黔桂地区、秦岭褶皱带和长江中下游地区的金矿床，有些我们调查研究过，另外一些选自中国的有关文献。前两章介绍了沉积岩金矿的分类。最后一章介绍运用权重法和地理信息系统 对秦岭褶皱带和滇黔桂地区的沉积岩金矿进行资源评估。附录 I 和 II 分别为中国中部和南部地区的航磁和重力扫描图，附录 III 的沉积岩金矿床一览表为交互式数据库，网址：<http://geopubs.wr.usgs.gov/open-file/of98-466/>附录 IV 为矿石样品的化学分析结果。

报告的第 1、2 章对中国沉积岩金矿床进行了分类和总结。中国沉积岩金矿床主要分布于西北地区秦岭褶皱带的扬子前寒武纪克拉通边缘，西南的滇黔桂地区以及东部的长江中下游地区。这些金矿床受区域性断裂、矿区规模的短轴背斜（穹隆）、矿床规模的高角度断层、层控角砾岩体和不断合面控制，主要产于古生代—中生代不纯灰岩、粉砂岩和泥岩中。蚀变类型有硅化、脱钙化、泥化和碳化，局部钠长岩化。除了煌斑岩和硅质岩脉外，沉积岩金矿床附近一般没有火成岩侵入体。但是长江中下游例外，产有与侵入岩有关的金矿床。

主要的金矿床类型有卡林型金矿床，与侵入体有关的金矿床、造山带的金矿床、不整合面的金矿床和红土型金矿床。在大多数沉积岩金矿床中，金主要呈浸染状产出，但在长江中下游地区局部金产在块状硫化物中，尤其是在层控平卧矿床中。不透明矿物有金矿、银金矿、黄铁矿、毒砂、辉锑矿、雄黄、雌

黄和毒砂、脉石矿物有石英、重晶石、有机碳、碳酸盐和粘土矿物，局部有钠长石。美国内华达州金矿床与 As, Sb, Tl 和 Hg 元素组合有关，中国许多沉积岩金矿床也与这些元素密切相关，而且 U, Sr 和铂族元素也与一些金矿床有关。

第 3 章论述了中国西南滇黔桂地区金矿床。这些金矿床与煤，锑，重晶石和汞矿有密切的空间关系，且大多数金矿床为层控或构造控制的浸染状矿床，通常与构造穹隆有关。这类金矿床的典型特征是产于不纯的钙质和碳质岩中。这些沉积岩含有浸染状黄铁矿、白铁矿和毒砂——其富砷边含微粒金。矿石中还有雄黄、雌黄、辉锑矿、汞矿和少量贱金属硫化矿。地球化学方面以 As, Sb, Hg 和 Ba 的含量升高为特征。

滇黔桂地区普遍缺失火成岩，表明该地区的成矿作用与侵入体无关。一些矿床的特征表明成矿的金属来源于沉积岩系的碳质岩石，该区的成矿组合可能是运移和形成石油及汞的成矿作用的产物，煤系地层中的 As, Au 和 Tl 也可能与这种成矿组合有关。另外一些金矿床的结构和明显受构造穹隆或剪切带控制的特征，表明同变形的矿石沉淀可能与右江裂谷系有关。该区几个沉积岩金矿床由于强烈的风化富集作用而形成红土型金矿。

第 4 章论述了秦岭褶皱带的沉积岩金矿床。秦岭褶皱带位于华北和扬子前寒武纪克拉通之间，呈西—北西走向，是一个长期活动带，含有几组层控和构造化的沉积岩金矿床，产于 EW 走向，长约 750 km，宽约 200 km 的晚古生代至早中生代已变形、褶皱的沉积岩和火山碎屑岩中。EW 向的褶皱带岩石为低级变质钙质砂岩、燧石、粉砂岩，以及互层的微晶灰岩、碳质和钙质板岩，局部有镁铁质火山岩。该带的岩浆活动普遍，形成许多古生代和中生代中性成分的岩株和侵入体的侵位。虽然李坝金矿床有许多与侵入体有关的地球化学特征，但是大多数沉积岩金矿床周围都没有见到火成岩出露，一些在卡林型金矿床中不常见的矿物，如白钨矿，铀矿物和钛矿物出现在秦岭褶皱带的一些金矿床中，局部还有钠长石。

第 5 章论述长江中下游地区金矿床，该区有几百个沉积岩铜、铁、金、硫和多金属矿床，是中国最重要的金属成矿带之一。上古生界至下中生界沉积岩有多个铜、金和多金属矿含矿层，并产有卡林型金矿床、浸染状远源沉积岩金矿床和红土型金矿床。局部产有斑岩金矿床。层控交代型金矿床产于鄂东南铜录山—大冶地区的三叠系沉积岩和安徽铜陵地区上石炭系粉砂质灰岩中。局部地区卡林型金矿床如张海金矿床产于志留系黑色页岩和粉砂岩中。铜录山（大冶）地区的金矿床与 160~180 Ma 的闪长岩有关，鸡笼山—封山洞—李家湾地区的金矿床与 140~150 Ma 的斑岩有关，金井嘴斑岩金矿床与 80 Ma 的岩株有关。安徽铜陵地区大多数层控金矿床，如铜官山、新桥、马山和黄狮涝山等与 137~153 Ma 的岩株有关。以蛇屋山金矿床为代表的红土型金矿床是金的表生再富集的产物。

报告第 6 章运用矿产资源评估权重法，评估了中国秦岭褶皱带和滇黔桂地区未发现的沉积岩金矿资源潜力。根据 Bayesian 概率，综合各种地质数据，如地质和构造建立的成矿模式编制成矿预测图，在已知沉积岩金矿床寥寥无几的上述两个研究区中圈出几个具区域规模的勘探靶区。该模式表明秦岭褶皱带和滇黔桂地区沉积岩金矿床预测的最重要标志依次为地层及与之有关的因素（靠近地层界线和岩性变化带）和构造有关因素（靠近断层和地形斜坡带）。

CONTENTS

Chapter

- 1.** Introduction to and Classification of Sedimentary- Rock-Hosted Deposits in P.R. China, *Stephen G. Peters, Huang Jiazhan, Jing Chenggui, and Li Zhiping*
- 2.** Comparison of Carlin-type Au Deposits in the United States, China, and Indonesia: Implications for genetic models and exploration, *Albert H. Hofstra, and Odin D. Christensen*
- 3.** Geology and Geochemistry of Sedimentary- Rock-Hosted Au Deposits of the Dian-Qian-Gui area, Guizhou, Yunnan Provinces and Guangxi District, P.R. China, *Stephen G. Peters, Huang Jiazhan, Li Zhiping, Jing Chenggui, and Cai Qiming*
- 4.** Geology and Geochemistry of Sedimentary- Rock-Hosted Au Deposits of the Qinling Fold Belt (Chuan-Shan-Gan) area, Shaanxi, Sichuan, and Gansu Provinces, P.R. China, *Stephen G. Peters, Huang Jiazhan, and Jing Chenggui*
- 5.** Geology and Geochemistry of Sedimentary- Rock-Hosted Au Deposits in the Middle-Lower Yangtze River area, Hubei and Anhui Provinces, P.R. China, *Stephen G. Peters, Huang Jiazhan, Wang, Yong Ji, Mark J. Mihalasky, and Jing Chenggui,*
- 6.** Weights-of-Evidence Analysis of Sedimentary Rock-Hosted Au Deposits in the P.R. China, *Chad S. Leonard, Mark J. Mihalasky, and Stephen G. Peters*

LIST OF APPENDICES

- I.** Aeromagnetic Maps of South and Central China
- II.** Gravity Maps of South and Central China
- III.** Database of Sedimentary Rock-Hosted Au Deposits of China
- IV.** Rock Geochemistry of Ores and Rocks

Detailed Table of Contents

Chapter 1 - Introduction to and Classification of Sedimentary Rock-Hosted Au Deposits in P.R. China

Abstract

INTRODUCTION

MINING, EXPLORATION and METALLURGY

 Mining

 Exploration

 Metallurgy

LOCATION of SEDIMENTARY ROCK-HOSTED Au DEPOSITS

GEOLOGIC SETTING

 Sedimentary rocks

 Igneous rocks

 Structural controls

 Metallogeny

CLASSIFICATION of SEDIMENTARY ROCK-HOSTED Au DEPOSITS

 Carlin-type Au deposits

 Pluton-related Au deposits

 Syngenetic, stratiform Au deposits

 Unconformity-hosted Au deposits

 Syndepositional Au deposits

 Red earth and laterite-hosted Au deposits

GEOCHEMISTRY

 Trace elements

 Fluid-inclusion and stable isotope characteristics

CONCLUSIONS

ACKNOWLEDGMENTS

REFERENCES

Chapter 2- Comparison of Carlin-type Au Deposits in the United States, China, and Indonesia:

Implications for genetic models and exploration

INTRODUCTION

DEPOSIT CHARACTERISTICS

 Orebody shape and control

 Mineralogical characteristics

 Geochemical Characteristics

TECTONICS

GUIZHOU AREA

QINLING AREA

MESEL Au DEPOSIT

SOURCE of WATER, CO₂, and H₂S

SUMMARY and CONCLUSIONS

REFERENCES

Chapter 3- Geology and Geochemistry of Sedimentary Rock-Hosted Au Deposits of the Dian-Qian-Gui area, Guizhou, Yunnan Provinces and Guangxi District, P.R. China

Abstract

INTRODUCTION

REGIONAL GEOLOGIC SETTING

DESCRIPTIONS of Au DEPOSITS

 Zimudang Au deposit

 Lannigou Au deposit

 Banqi Au deposit

 Yata Au deposit

 Getang Au deposit

 Sixianchang Au–Hg deposit

 Jinya Au deposit

 Gaolong Au deposit

 Gedang Au deposit

 Jinba Au deposit

 Hengxian Au deposit

DISCUSSIONS and CONCLUSIONS

ACKNOWLEDGMENTS

REFERENCES

Chapter 4 - Geology and Geochemistry of Sedimentary Rock-Hosted Au Deposits of the Qinling Fold Belt (Chuan-Shan-Gan) area, Shaanxi, Sichuan, and Gansu Provinces, P.R China

Abstract

INTRODUCTION

GEOLOGIC and TECTONIC SETTING

DISTRIBUTION and METALLOGENY

EAST QINLING FOLD BELT

 Paleozoic and Early Mesozoic Stratigraphy in the East Qinling fold belt

 Deposits along the Ding-Ma Au belt

 Jinlongshan (Zhenan) Au deposit

 Synd deformational Au deposits

 Maanqiao Au deposit

 Baguamiao Au deposit

 Shuangwang Au deposit

WEST QINLING FOLD BELT

 Stratigraphy in West Qinling fold belt

 Deposits along the Snow Mountain fault

 Songpangou Au deposit

 Qiaoqiaoshang Au deposit

 Dongbeizhai Au deposit

 Other Sedimentary Rock-Hosted Au Deposits

 Liba Au deposit

Yinchanggou Au deposit
Lianhechun Au deposit
Laerma Au–U deposit
Manaoke Au–W deposit
Ore Deposits along the Luhuo-Daofu Fault Zone
Pulongba Au deposit
Qiuluo Au deposit
CONCLUSIONS
ACKNOWLEDGMENTS
REFERENCES

Chapter 5 - Geology and Geochemistry of Sedimentary Rock-Hosted Au Deposits in the Middle-Lower Yangtze River area, Hubei and Anhui Provinces, P.R. China

Abstract

INTRODUCTION

GEOLOGIC SETTING

Sedimentary rocks

Igneous rocks

Structure

Gold Metallogeny

DESCRIPTION of DEPOSITS

Southeastern Hubei Province

Jilongshan-Fengshandong-Lijiawan Au skarn and porphyry deposits

Tonglushan Cu-Fe skarn deposits

JinJinzui Au porphyry deposit

Xiaojiapu Au oxide skarn deposit

Zhanghai Carlin-type Au deposit

Shewushan red earth Au deposit

Tongling area, Anhui Province

Tongguanshan Cu–Fe skarn

Xinqiao gossan Au deposit

Mashan gossan Au deposit

Huangshiloashan gossan Au deposit

CONCLUSIONS

ACKNOWLEDGMENTS

REFERENCES

Chapter 6 - Weights-of-Evidence Analysis of Sedimentary Rock-Hosted Au Deposits, P.R. China

Abstract

INTRODUCTION

METALLOGENY and GEOLOGY

General Characteristics of SRHG Deposits

Geologic Setting	
Geologic Summary of the Qinling Area	
Geologic Summary of the Dian-Qian-Gui Area	
WEIGHTS-of-EVIDENCE (WofE) MODELING	
Modeling Procedures	
Conditional Independence	
Error and Uncertainty	
DATASETS and ANALYSIS	
Training Set	
Layers of Evidence	
Geologic Map Units	
Lithodiversity	
Proximity to Geologic Contacts	
Proximity to Faults	
Topographic Slope	
Proximity to Anticlines	
FAVORABILITY MAP GENERATION and ANALYSIS	
Qinling Study Area	
Model QA	
Model QB	
Model QC	
Model QD	
Analysis of Qinling Study Area Models	
Interpretation of Qinling Study Area Models	
Dian-Qian-Gui Study Area	
Model DA	
Model DB	
Model DC	
Analysis of Dian-Qian-Gui Study Area Models	
Interpretation of Dian-Qian-Gui Study Area Models	
CONCLUSIONS	
ACKNOWLEDGEMENTS	
REFERENCES	

LIST OF FIGURES AND TABLES

(by chapter)

Chapter 1- Introduction to and Classification of Sedimentary Rock-Hosted Au Deposits in P.R.

- Figure 1-1. Map of the main areas of sedimentary rock-hosted Au deposits in China.
- Figure 1-2. Photograph of data exchange in the Xiaojiapu Mine area, Hubei Province, Middle-Lower Yangtze River area.
- Figure 1-3. Photograph of examples of mining methods used in various sedimentary rock-hosted Au deposits in China.
- Figure 1-4. Photograph of exploration methods used for sedimentary rock-hosted Au deposits in China.
- Figure 1-5. Soil geochemistry and structures at the Lannigou Au deposit.
- Figure 1-6. Exploration model for the Jilongshan, Fengshandong, and Lijiawan Cu, Fe, Ag, Au pluton-related Au deposits, southeastern Hubei Province, Middle-Lower Yangtze River area.
- Figure 1-7. Example of use of LANDSAT interpretation for exploration and metallogenic analysis in the Dian-Qian-Gui area.
- Figure 1-8. Photograph of metallurgical processing techniques used in various sedimentary rock-hosted Au deposits in China.
- Figure 1-9. Map of areas of sedimentary rock-hosted Au deposits in relation to main geologic units in China.
- Figure 1-10. Geologic map of the Liazishan dome of the Lannigou Au deposit, Dian-Qian-Gui area.
- Figure 1-11. Diagram of family tree of different classes of sedimentary rock-hosted Au deposits.
- Figure 1-12. Geologic map of the Carlin trend area, Nevada, showing domes, lithology, and lineaments.
- Figure 1-13. Microphotographs and scanning electron microscope backscatter image of As-rich pyrite zoning, Lannigou Au deposit, Dian-Qian-Gui area.
- Figure 1-14. Diagrams of results of geochemical modeling of Carlin-type ore fluids.
- Figure 1-15. Diagrammatic 3-D sketch of polymetallic oreshoot zoning in the Betze Orebody, Nevada.
- Figure 1-16. Diagrammatic cross section of the Fengshandong pluton-related and distal disseminated Ag-Au deposit, Hubei Province, Middle-Lower Yangtze River area.
- Figure 1-17. Diagrammatic sketch of hypothetical conversion of source bed to enriched ore bodies.
- Figure 1-18. Sketch of geologic section through the Changkeng unconformity-surface Au deposit, Guangdong Province.
- Figure 1-19. Sketches and photographs of examples of textures in orogenic, syn-deformational sedimentary rock-hosted Au (Carlin-type) deposits in Nevada.
- Figure 1-20. Photographs of examples of oxide, gossan, and lateritic sedimentary rock-hosted Au ores in China.
- Figure 1-21. Sketch of red earth deposits in limestone and lateritic and karst terrane.
- Figure 1-22. Triangular diagram of Co, Ni, and As in the Jinya Au deposit in Dian-Qian-Gui area.

Chapter 2 - Comparison of the tectonic settings and sources of ore fluids in Carlin-type Au deposits in the United States, P.R. China, and Indonesia: Implications for genetic and exploration models

- Figure 2-1. Location of Carlin-type Au deposits worldwide in Nevada in P.R. China. The Chinese deposits are present in the Qinling (fold belt) and Guizhou (Dian-Qian-Gui) areas.
- Figure 2-2. Pie charts of amounts of Au in Carlin-type deposits in the U.S. (Nevada), China, and Indonesia. Nevada contains the largest amount of reserves and resources
- Figure 2-3. Characteristics of Carlin-type deposits.
- Figure 2-4. Schematic model for northern Carlin trend Au deposits.
- Figure 2-5. Other sedimentary rock-hosted Au deposit in Nevada.
- Figure 2-6. Crustal structures associated with Carlin-type deposits in the Carlin trend area, northern Nevada.
- Figure 2-7. Mine-scale alteration zoning of Carlin-type deposits illustrated from the Carlin trend, Nevada.
- Figure 2-8 Mine-scale alteration zoning at the Mesel Au deposit, Indonesia. Modified from Garwin (1994).
- Figure 2-9. Gold-bearing arsenian pyrite rim on diagenetic pyrite from Post/Betze.
- Figure 2-10. Reflected light view of dark arsenian pyrite that locally rims bright diagenetic pyrite from Mesel, Indonesia.
- Figure 2-11. Photograph of orpiment-realgar vein at the Getchell Mine, Getchell trend, northern Nevada.
- Figure 2-12. Photograph of crystalline specimens of late ore stage orpiment and realgar from the Guizhou area, China.
- Figure 2-13. Photograph of specimen of late ore stage stibnite from the Guizhou area, China.
- Figure 2-14. Photographs of hand specimens of typical samples of late ore stage orpiment, stibnite, and calcite from Mesel, Indonesia.
- Figure 2-15. Geochemical data from 27 different Carlin-type deposits in Nevada.
- Figure 2-16. Geochemical data from 5 deposits in the Guizhou area relative to geochemical data from deposits in Nevada.
- Figure 2-17. Geochemical data from 2 deposits in the Qinling area; the Laerma and Qiongmo Au deposits relative to geochemical.
- Figure 2-18. Geochemical data from the Mesel Au deposit, Indonesia in relation to geochemical data from Nevada.
- Figure 2-19. Photographs buffalo, northern Nevada and China.
- Figure 2-20. Late Paleozoic and Mesozoic fold and thrust belts and Mesozoic Magmatism in the northern Great Basin.
- Figure 2-21. Schematic east-west cross section of northern Nevada and northwestern Utah.
- Figure 2-22. Sectional model for environment of Carlin-type Au deposits in northern Nevada.
- Figure 2-23. Tectonic setting of northern Nevada in Lower Eocene time.
- Figure 2-24. Tectonic setting of Carlin-type Au deposits in China.
- Figure 2-25. Graph showing that the bulk of Au in both areas in China is in Triassic sedimentary rocks.
- Figure 2-26. Geology and sedimentary rock-hosted Au deposits in the Guizhou (Dian-Qian-Gui) area.
- Figure 2-27. Mineralization styles in the Guizhou area for Carlin-type deposits.

- Figure 2-29. Schematic cross section through the Qinling orogenic belt, looking west.
- Figure 2-30. Geology and cross section of the Dongbeizhai Au deposit, Qinling area, China.
- Figure 2-31. Geologic setting of the Mesel Au deposit, Raratotok District, Sulawesi, Indonesia.
- Figure 3-32. Stratigraphic section at the Mesel Au deposit, Indonesia, showing location of Au ore in the Raratotok limestone.
- Figure 2-33. δD vs. $\delta^{18}O$ plot from Carlin-type Au deposits in northern Nevada.
- Figure 2-34. Stable isotopic data from deposits in the Guizhou and Qinling areas (red and blue)
- Figure 2-35. Plots of $\delta^{13}C$ vs. $\delta^{18}O$ data from altered rocks of late calcite veins from deposits in the Carlin trend, Jerritt Canyon, Cortez, and Alligator Ridge districts, northern Nevada.
- Figure 2-36. $\delta^{13}C$ vs. $\delta^{18}O$ plots of data from the Mesel Au deposit, Indonesia (top panel) and Qinling and Guizhou areas, China (bottom panel).
- Figure 2-37. Plots of $\delta^{34}S$ data from sedimentary rock-hosted and Carlin-type Au deposits in northern Nevada.
- Figure 2-38. Plots of $\delta^{34}S$ data from sedimentary rock-hosted and Carlin-type Au deposits in Qinling and Guizhou areas in China and the Mesel Au deposit in Indonesia.
- Figure 2-39. Summary of characteristics and features of Carlin-type Au deposits in China, Mesel Au deposit, Indonesia and Nevada.
- Figure 2-40. Diverse origins of Carlin-type deposits in terms of fluid sources.
- Figure 2-41. Frontiers in Exploration for Carlin-type Au deposits.

Chapter 3 - Geology and Geochemistry of Sedimentary Rock-Hosted Au Deposits of the Qinling Fold Belt (Chuan-Shan-Gan) area, Shanxi, Sichuan, and Gansu Provinces, P.R

- Figure 3-1. Geologic map and distribution of sedimentary rock-hosted Au deposits in the Dian-Qian-Gui area.
- Figure 3-2. Geologic parameters of the Dian-Qian-Gui area.
- Figure 3-3. Sedimentary facies in the Dian-Qian-Gui area.
- Figure 3-4. Geophysical interpretation of shallow crust in the Dian-Qian-Gui area.
- Figure 3-5. Photographs of examples of karst terrane, Dian-Qian-Gui area.
- Figure 3-6. Fluid flow along the Youjiang fault zone, Dian-Qian-Gui area.
- Figure 3-7. Geologic cross section of the Zimudang Au deposit.
- Figure 3-8. Diagrammatic sketch and cross section of the Zimudang Au deposit.
- Figure 3-9. Photographs of the Zimudang Au deposit area.
- Figure 3-10. Photographs of hand haulage methods at the Zimudang Au deposit.
- Figure 3-11. Photographs of ores from the Zimudang Au deposit.
- Figure 3-12. Scanning electron microscope back scatter images of sulfide grains in the Zimudang Au deposit.
- Figure 3-13. Geologic map of district geology, Lannigou Au deposit area.
- Figure 3-14. Photographs of mine area, Lannigou Au deposit.
- Figure 3-15. Geology of the Lannigou Au deposit area.
- Figure 3-16. Plan of the 4th level of part of the Lannigou Au deposit.
- Figure 3-17. Cross section of the Lannigou Au deposit.
- Figure 3-18. Geologic map of the 3rd level of part of the Lannigou Au deposit.
- Figure 3-19. Sketches showing phacoid development in the host shear zone, Lannigou Au deposit.
- Figure 3-20. Photographs of deformation textures, Lannigou Au deposit.
- Figure 3-21. Photographs of syncline-hosted ore, Lannigou Au deposit.
- Figure 3-22. Photographs of quartz veinlets in Au ores, Lannigou Au deposit.

- Figure 3-23. Microphotographs of sulfide grains in Au ores, Lannigou Au deposit.
- Figure 3-24. Scanning electron microscope backscatter images of sulfide grains, Lannigou Au deposit.
- Figure 3-25. Scanning electron microscope backscatter images of arsenopyrite in a quartz veinlet, Lannigou Au deposit.
- Figure 3-26. Geologic map of the Banqi Au deposit area.
- Figure 3-27. Geologic cross section of the Yata Au deposit.
- Figure 3-28. Geologic cross of the Getang Au deposit.
- Figure 3-29. Geologic sketch map of the Sixianchang Au–Hg deposit.
- Figure 3-30. Geologic cross section of the Jinya Au deposit.
- Figure 3-31. Photograph of panoramic view of Gaolong Au deposit.
- Figure 3-32. Photographs of mining and haulage, Gaolong Au deposit.
- Figure 3-33. Geologic map of the Gaolong Au deposit area.
- Figure 3-34. Geologic sketches of the main pit area, Gaolong Au deposit.
- Figure 3-35. Photographs of deformation textures in the main orebody, Gaolong Au deposit.
- Figure 3-36. Microphotographs of jasperoid, Gaolong Au deposit.
- Figure 3-37. Photographs of ore types and textures, Gaolong Au deposit.
- Figure 3-38. Map showing distribution of sedimentary rock-hosted Au deposits in the Funing-Guanguan area, Yunnan Province.
- Figure 3-39. Photograph of the Gedang Au deposit area.
- Figure 3-40. Geologic map of the Gedang Au deposit area.
- Figure 3-41. Geologic cross section of the Gedang Au deposit.
- Figure 3-42. Photographs of the Jinba Au deposit mine area.
- Figure 3-43. Photographs of open pits, Jinba Au deposit area.
- Figure 3-44. Geologic map of the Jinba Au deposit area.
- Figure 3-45. Sketch of orebodies in plan from the Jinba Au deposit.
- Figure 3-46. Conceptual sketch of relation among ore and gabbro, Jinba Au deposit.
- Figure 3-47. Photographs of Hengxian Au deposit area, Guangxi District, Dian-Qian-Gui area.
- Figure 3-48. Photograph of unloading of cyanide and lime from river dock.
- Figure 3-49. Photographs of vat leach process in the Hengxian Au mine
- Figure 3-50. Schematic Diagram of Geology of Nanxiang (Hengxian) Au Deposit.
- Figure 3-51. Geologic sections through Nanxiang (Hengxian) Au deposit.
- Figure 3-52. Photographs of ores and ore minerals in the Gaolong Au deposit.

Chapter 4 - Geology and Geochemistry of Sedimentary Rock-Hosted Au Deposits of the Dian-Qian-Gui area, Guizhou, Yunnan Provinces and Guangxi District, P.R. China

- Figure 4-1. Geologic map of Qinling fold belt area and distribution of sedimentary rock-hosted Au deposits.
- Figure 4-2. Structural sketch map of the Qinling fold belt area.
- Figure 4-3. Lithofacies sketch map of the Qinling fold belt area.
- Figure 4-4. Photograph of realgar and orpiment ores from the Qiaoqiaoshang Au deposit, west Qinling fold belt.
- Figure 4-5. Sketch maps of structural setting, geology, and ore deposits of the Ding-Ma Au belt, East Qinling fold belt.
- Figure 4-6. Sketch map of lithology and areas of the central Ding-Ma Au belt, East Qinling fold belt.

- Figure 4-7. Photographs of the Jinlongshan Au deposit, No. 304 orebody.
- Figure 4-8. Photographs of the Jinlongshan Au deposit, No. 301 orebody.
- Figure 4-9. Geologic sketch map and ore deposit model, Jinlongshan Au deposit.
- Figure 4-10. Geologic sketch of the No. 304 orebody open pit area, Jinlongshan Au deposit.
- Figure 4-11. Geologic cross section of the No. 301 orebody, Jinlongshan Au deposit.
- Figure 4-12. Host rock types in the Jinlongshan Au deposit.
- Figure 4-13. Folding near the Jinlongshan Au deposit.
- Figure 4-14. Deformation textures in ores from the Jinlongshan Au deposit.
- Figure 4-15. Photographs of quartz vein and veinlet textures, Jinlongshan Au deposit.
- Figure 4-16. Microphotographs of relation among Au ores to micro-fabric textures, Jinlongshan Au deposit.
- Figure 4-17. Scanning electron microscope back scatter images of stratabound ores, Jinlongshan Au deposit.
- Figure 4-18. Scanning electro microscope back scatter images of arsenically-zoned pyrite, Jinlongshan Au deposit.
- Figure 4-19. Scanning electron microscope back scatter images of zoned pyrite, Jinlongshan Au deposit.
- Figure 4-20. Scanning electron microscope back scatter images of sulfide minerals in the Jinlongshan Au deposit.
- Figure 4-21. Geologic sketch map of the Maanqiao Au deposit.
- Figure 4-22. Photographs of the Maanqiao Au deposit mine area.
- Figure 4-23. Photographs of the Maanqiao Au deposit area mine
- Figure 4-24. Diagrammatic sketches of the Maanqiao Au deposit orebodies.
- Figure 4-25. Photographs of shear zones in the Maanqiao Au deposit.
- Figure 4-26. Photograph of hand specimen of quartz vein from the Maanqiao Au deposit.
- Figure 4-27. Photographs of relations among ore minerals and micro-textures in the Maanqiao Au deposit.
- Figure 4-28. Microphotographs of relations among Au ore textures and host rock micro-textures, Maanqiao Au deposit.
- Figure 4-29. Scanning electron microscope back scatter images of arsenically zoned pyrite, Maanqiao Au deposit.
- Figure 4-30. Scanning electron microscope back scatter images of trace minerals in Au ores of the Maanqiao Au deposit.
- Figure 4-31. Scanning electron microscope back scatter images of ore textures and micro-paragenetic relations in ores from Maanqiao Au deposit.
- Figure 4-32. Geologic map and sections of the Shuangwang Au deposit.
- Figure 4-33. Geologic-tectonic map of the West Qinling fold belt area.
- Figure 4-34. Photographs and sketch of the Songpangou Au deposit area.
- Figure 4-35. Photographs of the Songpangou Au deposit area.
- Figure 4-36. Geologic sketch map of the Songpangou Au deposit area.
- Figure 4-37. Photograph of trace of Snow Mountain Fault.
- Figure 4-38. Photograph of realgar and orpiment ores, Songpangou Au deposit area.
- Figure 4-39. Photograph of realgar ore associated with calcite-filled crackle breccia.
- Figure 4-40. Microphotographs of hypogene and supergene ores, Songpangou Au deposit.
- Figure 4-41. Scanning electron microscope back scatter images of hypogene, arsenically-zoned pyrite, Songpangou Au deposit.

- Figure 4-42. Scanning electronic back scatter images of supergene arsenical ores, Songpangou Au deposit.
- Figure 4-43. Regional geology of the Qiaoqiaoshang Au deposit area.
- Figure 4-44. Geologic map of the Qiaoqiaoshang Au deposit.
- Figure 4-45. Photographs of the Qiaoqiaoshang Au deposit.
- Figure 4-46. Photographs of heap leaching processing areas, Qiaoqiaoshang Au deposit.
- Figure 4-47. Photographs of As-rich ores in the Qiaoqiaoshang Au deposit.
- Figure 4-48. Scanning electron microscope back scatter image of sulfide minerals, Qiaoqiaoshang Au deposit.
- Figure 4-49. Geologic sketch map of the Dongbeizhai Au deposit.
- Figure 4-50. Geologic sketch map of the Liba Au deposit.
- Figure 4-51. Geologic sketch map of the Yinchanggou Au deposit.
- Figure 4-52. Geologic sketch map of the Lianhechun Au deposit.
- Figure 4-53. Geologic sketch map of the Laerma Au–U deposit.
- Figure 4-54. Geologic sketch map of the Manaoke Au–W deposit.
- Figure 4-55. Geologic sketch map of the Pulongba Au deposit.
- Figure 4-56. Geologic sketch map of the Qiuluo Au deposit.

Chapter 5 - Geology and Geochemistry of Sedimentary Rock-Hosted Au Deposits in the Middle-Lower Yangtze River area, Hubei and Anhui Provinces, P.R. China

- Figure 5-1. Geologic map of the Middle-Lower Yangtze River area.
- Figure 5-2. Photographs of folded Paleozoic sedimentary rocks, Yangtze River Gorges.
- Figure 5-3. Geologic map of the southeastern part of Hubei Province.
- Figure 5-4. Geological longitudinal section across the Tonglushan Cu-Fe deposit.
- Figure 5-5. Model and mega xenoliths of the Tonglushan deposits.
- Figure 5-6. Diagrammatic cross section of the Jilongshan-Fengshandong-Lijiawan area.
- Figure 5-7. Photographs of the Tonglushan and JinJinzui deposit areas.
- Figure 5-8. Diagrammatic sketches of the JinJinzui Au-porphyry deposit.
- Figure 5-9. Geologic map of the Xiaojiapu Au deposit area.
- Figure 5-10. Photograph of exploration adit, Xiaojiapu Au deposit.
- Figure 5-11. Geologic cross section of igneous rock-hosted ore, Xiaojiapu Au deposit.
- Figure 5-12. Geologic cross section of the Xiaojiapu Au deposit, showing oxide Au ore and polymetallic hypogene horizons.
- Figure 5-13. Geologic cross section of the Xiaojiapu Au deposit showing breccia bodies and alteration.
- Figure 5-14. Scanning electron microscope back scatter image of sulfide ore, Xiaojiapu Au deposit.
- Figure 5-15. Photograph of gossan outcrop, Xiaojiapu Au deposit.
- Figure 5-16. Scanning electron microscope back scatter image of Sr ore, Xiaojiapu Au deposit.
- Figure 5-17. Geologic map of the Zhanghai Au deposit.
- Figure 5-18. Photographs of the Zhanghai Au deposit mine area.
- Figure 5-19. Photographs of heap leach operations and vats, Zhanghai Au deposit.
- Figure 5-20. Geologic cross sections through the Zhanghai Au deposits.
- Figure 5-21. Geologic cross section of the Zhanghai Au deposit showing adit.

- Figure 5-22. Photographs, looking west, showing the main F_2 fault, Zhanghai Au deposit.
- Figure 5-23. Photographs of Au ore hand specimens, Zhanghai Au deposit.
- Figure 5-24. Photographs and scanning electron microscope back scatter images of Au ores, Zhanghai Au deposit.
- Figure 5-25. Scanning electron microscope back scatter images of arsenopyrite growths on disseminated pyrite grains, Zhanghai Au deposit.
- Figure 5-26. Scanning electron microscope back scatter images of polymetallic sulfide ores, Zhanghai Au deposit.
- Figure 5-27. Sketch map of the Shewushan Au deposit area.
- Figure 5-28. Photographs of Shewushan Au deposit area.
- Figure 5-29. Photographs of Shewushan Au deposit mine area.
- Figure 5-30. Photograph of hopper and snakehead outcrop, Shewushan Au deposit.
- Figure 5-31. Photographs of heap leach facilities, Shewushan Au deposit.
- Figure 5-32. Stratigraphic section at the Shewushan Au deposit.
- Figure 5-33. Geologic cross section through the Shewushan Au deposit.
- Figure 5-34. Geologic cross section through the No.1 orebody, Shewushan Au deposit.
- Figure 5-35. Photograph of base of saprolite/laterite zone, Shewushan Au deposit.
- Figure 5-36. Photograph of laterite textures in Au ore, Shewushan Au deposit.
- Figure 5-37. Photographs of mottled saprolitic Au ore, Shewushan Au deposit.
- Figure 5-38. Photographs of hand specimen-scale textures in au ores, Shewushan Au deposit.
- Figure 5-39. Geologic map of the Tongling district, Anhui Province.
- Figure 5-40. Photographs of the open pit mine, Xinqiao Au deposit.
- Figure 5-41. Photographs of the flotation mill at Xinqiao Au deposit.
- Figure 5-42. Geologic map of the district around the Xinqiao Au deposit.
- Figure 5-43. Geologic map of the Xinqiao Au deposit.
- Figure 5-44. Composite geologic cross sections of the Xinqiao Au deposit.
- Figure 5-45. Photographs of host rocks near the Xinqiao open pit mine.
- Figure 5-46. Photograph and scanning electron microscope back scatter image of polymetallic sulfide ores, Xinqiao Au deposit.
- Figure 5-47. Scanning electron microscope back scatter image of polymetallic sulfide ores, Xinqiao Au deposit.
- Figure 5-48. Scanning electron microscope back scatter image of Ag-rich ores, Xinqiao Au deposit.
- Figure 5-49. Geologic map of the Mashan Au deposit.
- Figure 5-50. Geologic cross section of the Mashan Au deposit.
- Figure 5-51. Geologic cross section of the Mashan Au deposit.
- Figure 5-52. Photographs of the Mashan Au deposit mine area.
- Figure 5-53. Photographs of gossan outcrops of Au horizon, Mashan Au deposit.
- Figure 5-54. Photographs of hand specimens of marble-sulfide mineral contacts, Mashan Au deposit.
- Figure 5-55. Photographs of folded sulfide mineral layers in marble, Mashan Au deposit.
- Figure 5-56. Photographs of massive, hypogene sulfide ore, Mashan Au deposits.
- Figure 5-57. Photographs of layered sulfide mineral band, Mashan Au deposit.
- Figure 5-58. Scanning electron microscope back scatter images of sulfide minerals, Mashan Au deposit.

- Figure 5-59. Scanning electron microscope back scatter image of sulfide ore from Mashan deposit.
- Figure 5-60. Geologic map of the Huangshiloashan Au deposit.
- Figure 5-61. Geologic cross section of the Huangshiloashan Au deposit.
- Figure 5-62. Photographs of Huangshiloashan Au deposit mine area.
- Figure 5-63. Photographs of Huangshiloashan Au deposit mine area.
- Figure 5-64. Photographs of hand-specimens of gossan ore, Huangshiloashan Au deposit.
- Figure 5-65. Scanning electron microscope back scatter images of hypogene polymetallic ores, Huangshiloashan Au deposit.
- Figure 5-66. Scanning electron microscope back scatter image of arsenopyrite-rich hypogene Au ores, Huangshiloashan Au deposit.

List of Tables

- Table 5-1. Sulfur isotope analysis from sedimentary rock-hosted Au deposits in the Middle-Lower Yangtze River area

Chapter 6 - Weights-of-Evidence Analysis of Sedimentary Rock-Hosted Au Deposits, P.R. China

- Figure 6-1. Peoples Republic of China, showing the study areas of Qinling and Dian-Qian-Gui.
- Figure 6-2. Tectonic setting of the Qinling and Dian-Qian-Gui areas. The Dian-Qian-Gui area is located in a sedimentary rock province along the southwestern margin of the Yangtze craton, while the Qinling area is positioned in a sedimentary basin that separates the Hubei and Yangtze cratons. Modified from Li, Z.P. and Peters (1998).
- Figure 6-3. Generalized tectonic setting of the Qinling area.
- Figure 6-4. Generalized tectonic setting of the Dian-Qian-Gui area.
- Figure 6-5. Flow chart illustrating the weights-of-evidence modeling method. The method is subdivided into 3 main procedures, as indicated by the numbered brackets on the left. See text for discussion.
- Figure 6-6. Area-cumulative contrast curve for an evidence map that has 10 classes. This curve is used to help determine the optimum threshold between absence and presence of a predictor pattern for ordinal (or ranked), interval, or ratio scaled data. The table in the lower portion of the figure shows how the classes would be grouped into predictor pattern present or absent for the measurements of proximity (0 = close; 10 = far), intensity (0 = low; 10 = high), and concentration (0 = low; 10 = high).
- Figure 6-7. Qinling area with SRHG sites labeled. Names and locations of sites are listed in table 6-1.
- Figure 6-8. Dian-Qian-Gui area with SRHG sites labeled. Names and locations of sites are listed in table 6-2.
- Figure 6-9. Geological map of the Qinling area (legend is found in figure 6-10).

- Figure 6-10. Legend for the geological map of the Qinling and Dian-Qian-Gui area (see Figures 6-9 and 6-12, respectively). Legend layout, style, and geological map unit classification scheme is adopted from the Geological Map of China (Cheng, 1990). See Cheng (1990) and Wang (199) for additional details.
- Figure 6-11. Predictor map of geological map units, Qinling area.
- Figure 6-12. Geological map of Dian-Qian-Gui area (legend is found in figure 6-10).
- Figure 6-13. Predictor map of geological map units, Dian-Qian-Gui Area.
- Figure 6-14. Map of lithodiversity, Qinling area.
- Figure 6-15. Spatial association between lithodiversity and training sites, Qinling area.
- Figure 6-16. Predictor map of lithodiversity, Qinling area.
- Figure 6-17. Map of lithodiversity, Dian-Qian-Gui area.
- Figure 6-18. Spatial association between lithodiversity and training sites, Dian-Qian-Gui area.
- Figure 6-19. Predictor map of lithodiversity, Dian-Qian-Gui area.
- Figure 6-20. Proximity to Paleozoic-Mesozoic geologic unit contacts, Qinling area.
- Figure 6-21. Spatial association between proximity to Paleozoic-Mesozoic geologic unit contacts and training sites, Qinling area.
- Figure 6-22. Predictor map for proximity to Paleozoic-Mesozoic geologic unit contacts, Qinling area.
- Figure 6-23. Proximity to Permian-Triassic geologic unit contacts, Dian-Qian-Gui area.
- Figure 6-24. Spatial association between proximity to Permian-Triassic geologic unit contacts and training sites, Dian-Qian-Gui area.
- Figure 6- 25. Predictor map for proximity to Permian-Triassic geologic unit contacts, Dian-Qian-Gui area.
- Figure 6-26. Proximity to faults, Qinling area.
- Figure 6-27. Spatial association between proximity to faults and training sites, Qinling area.
- Figure 6-28. Predictor map for proximity to faults, Qinling area.
- Figure 6-29. Proximity to ENE-trending faults, Dian-Qian-Gui area.
- Figure 6-30. Spatial association between proximity to ENE-trending faults and training sites, Dian-Qian-Gui area.
- Figure 6-31. Predictor map of proximity to ENE-trending faults and training sites, Dian-Qian-Gui area.
- Figure 6-32. Proximity to the Youjiang Fault System, Dian-Qian-Gui.
- Figure 6-33. Spatial association between proximity to the Youjiang Fault System and training sites, Dian-Qian-Gui.
- Figure 6-34. Predictor map for proximity to the Youjiang Fault System and training sites, Dian-Qian-Gui.
- Figure 6-35. Topographic slope map, Qinling area.
- Figure 6-36. Spatial association between topographic slope and training sites, Qinling area.
- Figure 6-37. Predictor map of topographic slope, Qinling area.
- Figure 6-38. Topographic slope map, Dian-Qian-Gui area.
- Figure 6-39. Spatial association between topographic slope and training sites, Dian-Qian-Gui area.
- Figure 6-40. Predictor map of topographic slope, Dian-Qian-Gui area.
- Figure 6-41. Proximity to anticline axes, Dian-Qian-Gui area.

- Figure 6-42. Spatial association between proximity to anticline axes and training sites, Dian-Qian-Gui area.
- Figure 6-43. Predictor map of proximity to anticline axes, Dian-Qian-Gui area.
- Figure 6-44. Model QA favorability map, Qinling area.
- Figure 6-45. Model QB favorability map, Qinling area.
- Figure 6-46. Model QC favorability map, Qinling area.
- Figure 6-47. Predictor map of merged geological map units and proximity to Paleozoic-Mesozoic geologic unit contacts, Qinling area.
- Figure 6-48. Model QD favorability map, Qinling area.
- Figure 6-49. Model QC total uncertainty map, Qinling area.
- Figure 6-50. Favorability map of Model QC used for interpretation, Qinling area. Note that areas with favorabilities less than or equal to the prior have been masked out (light gray). Five km buffers have been placed around all training sites (dark gray around sites).
- Figure 6-51. Model DA favorability map, Dian-Qian-Gui area.
- Figure 6-52. Predictor map of merged geological map units and proximity to Permian-Triassic geologic unit contacts, Dian-Qian-Gui area.
- Figure 6-53. Model DB favorability map, Dian-Qian-Gui area.
- Figure 6-54. Model DC favorability map, Dian-Qian-Gui area.
- Figure 6-55. Model DB total uncertainty map, Dian-Qian-Gui area.
- Figure 6-56. Model DC total uncertainty map, Dian-Qian-Gui area.
- Figure 6-57. Favorability map of Model DB used for interpretation, Dian-Qian-Gui area. Note that areas with favorabilities less than or equal to the prior have been masked out (light gray). Five km buffers have been placed around all training sites (dark gray around sites).
- Figure 6-58. Favorability map of Model DC used for interpretation, Dian-Qian-Gui area. Note that areas with favorabilities less than or equal to the prior have been masked out (light gray). Five km buffers have been placed around all training sites (dark gray around sites).

List of tables

- Table 6-1. Names and coordinates of SRHG training sites in the Qinling area.
- Table 6-2. Names and coordinates of SRHG training sites in the Dian-Qian-Gui area.
- Table 6-3. Weights of spatial association calculated for geological map units in the Qinling area. Note that weights with Studentized contrast values greater the desired 1.282 cutoff are shaded in light gray.
- Table 6-4. Weights of spatial association calculated for geological map units in the Dian-Qian-Gui area. Note that weights with Studentized contrast values greater the desired 1.282 cutoff are shaded in light gray.
- Table 6-5. Weights of spatial association for Model QA, Qinling area.
- Table 6-6. Chi-square values for pairwise conditional independence testing of Model QA, Qinling area.
- Table 6-7. Weights of spatial association for Model QB, Qinling area.

- Table 6-8. Chi-square values for pairwise conditional independence testing of Model QB, Qinling area.
- Table 6-9. Weights of spatial association for Model QC, Qinling area.
- Table 6-10. Chi-square values for pairwise conditional independence testing of Model QC, Qinling area.
- Table 6-11. Weights of spatial association for Model QD, Qinling area.
- Table 6-12. Chi-square values for pairwise conditional independence testing of Model QD, Qinling area.
- Table 6-13. Weights of spatial association for Model DA, Dian-Qian-Gui area.
- Table 6-14. Chi-square values for pairwise conditional independence testing of Model DA, Dian-Qian-Gui area.
- Table 6-15. Weights of spatial association for Model DB, Dian-Qian-Gui area.
- Table 6-16. Chi-square values for pairwise conditional independence testing of Model DB, Dian-Qian-Gui area.
- Table 6-17. Weights of spatial association for Model DC, Dian-Qian-Gui area.
- Table 6-18. Chi-square values for pairwise conditional independence testing of Model DC, Dian-Qian-Gui area.

APPENDICES

Appendix I. Aeromagnetic Maps of South and Central China

- Figure I-A. General index of map name and numbers of aeromagnetic maps.
- Figure I-B. Mosaic and index as inset, showing location of aeromagnetic map coverage in Appendix I in China.
- Figure I-C. Mosaic and index (see also, figs. I-A and I-B).
- Figure I-D. Mosaic showing outline of Dian-Qian-Gui, Qinling fold belt and Middle-Lower Yangtze river areas and locations of figures I-E, I-G, and I-F.
- Figure I-E. Aeromagnetic map mosaic of the Dian-Qian-Gui area with sedimentary rock-hosted Au deposits, fold axial planes and major faults.
- Figure I-F. Aeromagnetic mosaic map of the Qinling fold belt area with sedimentary rock-hosted Au deposits, geologic unit outlines, major shear zone and east and west parts of belt.
- Figure I-G. Aeromagnetic map of the Middle-Lower Yangtze River area with sedimentary rock-hosted Au deposits discussed in Chapter 5 labeled.
- Folder I-*mag_maps*. Individual were 4f high by 6f long, 1:1,000,000-scale, aeromagnetic maps [11 sheets].

Appendix II. Gravity Maps of South and Central China

- Figure II-A. General index of map name and numbers of gravity maps.
- Figure II-B. Mosaic and index as inset, showing location of gravity map coverage in Appendix I in China.
- Figure II-C. Mosaic and index of contoured gravity maps (see also, figs. II-A and II-B).
- Figure II-D. Mosaic gravity map showing outline of Dian-Qian-Gui, Qinling fold belt, and Middle-Lower Yangtze river areas and locations of figures II-E, F, G, H, I, J, K, L, and M.
- Figure II-E. Gravity contour map mosaic of the Dian-Qian-Gui area with labeled sedimentary rock-hosted Au deposits discussed in Chapter 3.
- Figure II-F. Gravity contour map mosaic of the Dian-Qian-Gui area with labeled sedimentary rock-hosted Au deposits discussed in Chapter 3, showing major faults.
- Figure II-G. Gravity contour map mosaic of the Dian-Qian-Gui area with labeled sedimentary rock-hosted Au deposits discussed in text, with major faults and major lithologic contacts.
- Figure II-H. Gravity mosaic contour map of the Qinling fold belt area with sedimentary rock-hosted Au deposits discussed in Chapter 4.
- Figure II-I. Gravity mosaic contour map of the Qinling fold belt area with labeled sedimentary rock-hosted Au deposits discussed in Chapter 4, showing major faults and shear zones.
- Figure II-J. Gravity mosaic contour map of the Qinling fold belt area with labeled sedimentary rock-hosted Au deposits discussed in Chapter 4, with geologic unit outlines.
- Figure II-K. Gravity mosaic contour map of the Middle-Lower Yangtze River area with labeled sedimentary rock-hosted Au deposits discussed in Chapter 5.
- Figure II-L. Gravity mosaic contour map of the Middle-Lower Yangtze River area with labeled sedimentary rock-hosted Au deposits discussed in Chapter 5, showing major faults and shear zones.
- Figure II-M. Gravity mosaic contour map of the Middle-Lower Yangtze River area with labeled sedimentary rock-hosted Au deposits discussed in Chapter 5, showing major lithologic unit contacts.
- Folder II-*grav_maps*. Plates of individual 4° high by 6° long, 1:1,000,000-scale, gravity maps [11 sheets].